



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/811,628	03/29/2004	Tapesh Yadav	A15 DIV(16)	2732
25235	7590	10/25/2005	EXAMINER	
HOGAN & HARTSON LLP ONE TABOR CENTER, SUITE 1500 1200 SEVENTEENTH ST DENVER, CO 80202			LE, HOA T	
			ART UNIT	PAPER NUMBER
			1773	

DATE MAILED: 10/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/811,628

Applicant(s)

YADAV ET AL.

Examiner

H. T. Le

Art Unit

1773

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) 4, 6, 7 and 21-32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5 and 8-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

#### *Election/Restrictions*

2. Newly submitted claims 21-32 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

- a. Claims 21-23 are directed to chalcogen species different from the examined nitrogen and oxygen elements. Thus claims 21-23 are restrictable from original claims as different species.
- b. Claims 24-27 require at least two or three elements in the nanomaterial which are directed to a material that is different and unrelated from the nanomaterial recited the original claims. Claims 24-27 are restrictable from the original claims as unrelated invention.
- c. Claims 28-32 are directed to reaction of the nanomaterial and a precursor that would result a new product. Claims 28-32 are restrictable from the original claims as intermediate-final product relatedness.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 21-32 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

3. Amended claims 4, 6 and 7 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: The original claims are directed to chalcogen-containing nanomaterial while the claims 4, 6 and 7 as amended are directed to metallic nanomaterial which belongs to a different chemical class of material than that of the original claims. Claims 4, 6 and 7 are restrictable from the original claims as unrelated invention.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 4, 6, and 7 are treated as newly added claims and are now withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1-3, 5, and 8-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. The instant claims are directed to a nanomaterial having an aspect ratio up to an upper limit of less than 1,000,000. This would mean that one dimension of the

nanomaterial is in the ten-micron scale, hundred-micron scale and/or in the millimeter scale.

The specification provides no teaching as to how such nanomaterial is obtained; how such length can be obtained and maintained when the diameter is in the nanometer scale. One skilled in the art understands that even making just one particular nanomaterial with such large aspect ratio is extremely difficult, let alone making a vast variety of nanomaterials ranging from metallic to inorganic to polymer nanomaterial as claimed; especially with a polymeric material when at nanoscale diameter, the molecules would be so extraordinarily strained in such a way that it cannot be seen how a length at up to one million times the dimension of the diameter can possibly be obtained and maintained. Because the specification is devoid of detailed description of how the nanomaterial with such extreme aspect ratio is made, it appears that Applicant did not have possession of the claimed invention at the time the application was filed.

6. Claims 1-3, 5, and 8-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claims contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The instant claims are directed to a nanomaterial having an aspect ratio up to an upper limit of less than 1,000,000. This would mean that one dimension of the nanomaterial is in the ten-micron scale, hundred-micron scale and/or millimeter scale. The specification provides no teaching as to how such nanomaterial is obtained. One skilled in the art understands that making even just one particular nanomaterial with such large aspect ratio is extremely

Art Unit: 1773

difficult, let alone making a vast variety of nanomaterials ranging from metallic to inorganic to polymer nanomaterial as claimed; ; especially with a polymeric material when at nanoscale diameter, the molecules would be so extraordinarily strained in such a way that it cannot be seen how a length at up to one million times the dimension of the diameter can possibly be obtained and maintained. Because the specification is devoid of detailed description of how the claimed nanomaterial of such extreme aspect ratio is made, the specification fails to comply with the enablement requirement.

7. Claims 1-3 and 5 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contain subject matter which were not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 1-3 are now amended to limit to “compositional uniform” nanomaterial. However, No support for “compositional uniform” can be found in the originally filed specification.

#### *Claim Rejections - 35 USC § 102*

8. Claims 1-3, 5, and 8-20 are rejected under 35 U.S.C. 102(a) or (b) as being anticipated by the Schooman article (“nanostructured materials in solid state ionics”)\*

Claims 1, 3, 5, 8, 9, 12, 13-16, 18, 19 and 20: The Schooman article discusses chalcogenide nanomaterial, inorganic nanomaterial, and polymeric nanomaterial dating back to the 70's.

See page 6, left column, first paragraph, and pages 6-7, under the section “History of

---

\* Copy of this article has been provided by Applicant.

nanostructured materials”. In addition, the Schooman article also discusses Maya blue paint, which is a nanomaterial made by ancient Native Americans. Nanoparticles with aspect ratio of larger than 2 are discussed and reviewed at page 7, left column, last two paragraphs. Claims 2, 10, 11 and 17: Non-stoichiometric nanomaterials are discussed at page 15, right column, last paragraph and also at page 7, last paragraph (defects in chemistry and electrical conductivity result in non-stoichiometry).

9. Claims 1, 3, 5, 16, and 18-20 are rejected under 35 U.S.C. 102 (b) as being anticipated by the Xin article (“Formation of self-assembling CdSe quantum dots on ZnSe by molecular beam epitaxy”).\*\*

The Xin article teaches chalcogenide-containing nanoparticles, i.e. ZnCdSe/ZnSe quantum dots having an aspect ratio of 4. See abstract.

10. Claims 1-3, 4, 5, 8-13 and 16-20 are rejected under 35 U.S.C. 102 (a) or (b) as being anticipated by various articles as discussed below.

Claims 1, 3, 4, 5, 8, 9, 19 and 20: See “Maya Blue Paint: An Ancient Nanostructured Material” by Jose-Yacaman et al. See page 224, last two paragraphs: needle shaped crystallites indicate an aspect ratio of greater than two. The materials are metallic (page 224, last paragraph). The material is inorganic (page 224, last paragraph) and is dyed with synthetic indigo containing nitrogen (page 224, first paragraph). Therefore, it’s an inorganic nanomaterial containing nitrogen.

---

\*\* Copy of this article has been provided by Applicants.

Art Unit: 1773

Claims 1, 2, 10, 11, 19 and 20: See “Nonstoichiometry and Electrical Conductivity of Nanocrystalline  $\text{CeO}_{2-x}$ ”, by Chiang et al. See abstract and page 7, left column; and page 13, second paragraph.

Claims 8-9: See “Carbonitride nanomaterials, Thin Films, and Solids” by Khabashesku Margrave. Carbonitrides as disclosed are nanomaterials. These nanomaterials are non-spherical; therefore, they all have an aspect ratio of larger than one or some at least two. This rejection has been made in the previous office action.

Claims 8-9: See “Growth of boron nitride nanotubes and iron nanowires from the liquid flow of FeB nanoparticles” by Kian Ping Loh et al. Nanotubes and nanowires by definition are nanomaterial with an aspect ratio of at least two. BN contains nitrogen. BN and Fe are metallic materials. This rejection has been made in the previous office action.

Claims 12-13: See “Catalytic Properties of Ni-B and Ni-P ultrafine materials” by Shao-pai Lee and Yu-Wen Chen. These ultrafine are nanomaterials and Ni-P contains phosphorous. The nanomaterials are non-spherical; therefore, they all have an aspect ratio of larger than 1 or at least two. This rejection has been made in the previous office action

Claims 16-20: See “Growth of boron nitride nanotubes and iron nanowires from the liquid flow of FeB nanoparticles” by Kian Ping Loh et al. At page 5, left column, Loh et al disclose a well-faceted of Fe. The Fe nanoparticles are also described as “vertically elongated” (page 5, last paragraph, right column). Elongated particles have a “plate-like” structure. Fe is a non-oxide. Nanoparticles of Fe is a non-oxide nanoparticles.



Art Unit: 1773

11. Applicant's arguments filed June 17, 2005 have been fully considered but they are not persuasive for reasons set forth above and/or deemed moot in view of the new grounds of rejection set forth above.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to H. T. Le whose telephone number is 571-272-1511. The examiner can normally be reached on 10:00 a.m. to 6:30 p.m., Mondays to Fridays.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



H. T. Le  
Primary Examiner  
Art Unit 1773